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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/648,857 | 08/25/2003 | Keishi Takeyama | 03504/LH | 4191 |

1933 7590 01/19/2007

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| EXAMINER | |
|---|---|
| HANDAL, KAITY V | |
| ART UNIT | PAPER NUMBER |
| 1764 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|---|---|---|
| 3 MONTHS | 01/19/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/648,857 | TAKEYAMA ET AL. | |
| | Examiner | Art Unit | |
| | Kaity Handal | 1764 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *13 November 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-2, 4-12, 23-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Keegan et al. (US 2002/0081471 A1).

With respect to claim 1, Keegan teaches an apparatus comprising: a micro reactor/reformer (figure 4) (page 4, paragraph [0049], lines 1-8) in which a flow path is formed for a fluid (as illustrated by inlet (120) through outlet (125)); and container/system enclosure (130 & 220) which accommodates the micro reactor and keeps an atmosphere on a periphery of the micro reactor at a pressure of not more than 1 Pa/(under vacuum) (page 4, paragraph [0051], lines 1-13).

3. Claims 1-2, 4-9, 11-12, 23 and 25 are rejected under 35 U.S.C. 102(e)/103(a) as being anticipated by Faville et al. (US 6,562,496 B2).

With respect to claim 1, Faville teaches an apparatus comprising: a micro reactor/reformer (fig. 1, 123) comprising a flow path (as illustrated by inlet (101) through outlet (107)); and container/system enclosure (100) which accommodates

the micro reactor (123) and keeps an atmosphere on a periphery of the micro reactor at pressure not more than 1 Pa/vacuum. It would be obvious that the container/enclosure (100) would inherently withstand and perform in vacuum since Faville does teach having different pressures within the container/enclosure (100) (see Abstract).

With respect to claim 2, Faville teaches wherein an adsorption means (104 & 105) for adsorbing a medium which exists inside the container and propagates heat (col. 3, lines 30-32).

With respect to claims 4-6, Faville teaches wherein said reformer has a heating means (col. 8, lines 9-10) for generating heat to heat the micro reactor.

Regarding limitations recited in claims 7 and 12 which are directed to a manner of operating disclosed device, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

With respect to claims 8-9, Faville teaches wherein the micro reactor (123) comprises a reactor which changes the fluid from a liquid phase a gas phase (col. 7, lines 67-col. 8, lines 1-2).

With respect to claim 11, Faville teaches wherein a temperature measurement means exists for measuring the temperature of the micro reactor (col. 10, lines 62-67).

With respect to claims 23 and 25, Faville teaches an apparatus comprising: a micro reactor (fig. 1, 123) comprises a flow path for fluid (as illustrated by inlet (101) through outlet (107)); and container/system enclosure (100) which accommodates the micro reactor (123) and keeps an atmosphere on a periphery of the micro reactor at a pressure of not more than 1 Pa/vacuum, and an adsorption means (104 & 105) for adsorbing a medium which exists inside the container and propagates heat (col. 3, lines 30-32).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Faville et al. (US 6,562,496 B2), as applied to claim 23 above, and further in view of Wegeng et al. (US 2003/0015093 A1).

With respect to claim 24, Faville discloses all claim limitations as set forth above but fails to show wherein the adsorption means comprises a polyimide-based material. Wegeng teaches an apparatus for swing adsorption as applied to fuel

reformers (page 9, paragraph [0096]) comprising a polyimide-based material in order to enhance the rate of indirect heat transfer (page 11, paragraph [0121], lines 11-20).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a polyimide-based material as the adsorption means in Faville's apparatus, as taught by Wegeng, in order to enhance the rate of indirect heat transfer.

6. Claims 10 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Faville et al. (US 6,562,496 B2), as applied to claim 23 above, and further in view of Struthers et al. (US 2002/0110712 A1).

With respect to claim 10, Faville discloses all claim limitations as set forth above but fails to show wherein the micro reactor comprises a reforming reactor which reforms carbon monoxide in the fluid into carbon dioxide. Struthers teaches a hydrogen generator (figure 1) comprising a reforming reactor/scavenger (22) (page 3, paragraph [0061]) which reforms carbon monoxide in the fluid into carbon dioxide in order to liquefy carbon dioxide and deliver it to a useful end (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a reforming reactor which reforms carbon monoxide in the fluid into carbon dioxide in Faville's apparatus, as taught by Struthers, in order to liquefy carbon dioxide and deliver it to a useful end.

With respect to claims 26-27, Faville discloses all claim limitations as set forth above but fails to show wherein the adsorption means has a surface coated with a material which physically/chemically adsorbs water or oxygen. Struthers teaches a hydrogen generator comprising an adsorption means (fig. 1, 20) comprising Yttrium and therefore can physically/chemically adsorbs water or oxygen in order to absorb sulfur (page 5, paragraph [0084]).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include an adsorption means comprising Yttrium in Faville's apparatus, as taught by Struthers, in order to absorb sulfur.

***Response to Arguments***

Specification

Objection made to the specification is withdrawn by the examiner due to applicant's amendment made to the abstract.

Prior Art Rejection

Applicant argues that the pressure of the atmosphere in which the container accommodates the micro reactor is a structural feature; and that Keegen does not disclose, teach or suggest keeping an atmosphere on a periphery of a micro reactor at a pressure of not more than 1 Pa.

Examiner respectfully disagrees. It is maintained that the pressure of the atmosphere in which the container accommodates the micro reactor is a

process/operational limitation. Furthermore, Keegan teaches wherein the pressure differential can be from higher in the enclosure (220) to higher within the reformer (210). Keegan further suggests that the pressure differential may vary depending on the particular system needs (page 5, paragraph [0060]).

Applicant argues that although Faville et al discloses a "thermal management" (cooling) system, this reference does not disclose, teach or suggest a container which accommodates the micro reactor and keeps an atmosphere on a periphery of the micro reactor at a pressure of not more than 1 Pa, as according to the present invention as recited in amended independent claims 1 and 23.

Examiner respectfully disagrees. It is maintained that the pressure of the atmosphere in which the container accommodates the micro reactor is a process/operational limitation. Furthermore, Faville teaches an apparatus comprising: a micro reactor/reformer (fig. 1, 123) comprising a flow path (as illustrated by inlet (101) through outlet (107)); and container/system enclosure (100) which accommodates the micro reactor (123) and keeps an atmosphere on a periphery of the micro reactor at pressure not more than 1 Pa/vacuum. It would be obvious that the container/enclosure (100) would inherently withstand and perform in vacuum since Faville does teach having different pressures within the container/enclosure (100) (see Abstract).

Both Keegen and Faville teach structures that are capable of being operated at different pressures as set forth in the rejection above.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaity Handal whose telephone number is (571) 272-8520. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KH

6/8/2006

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